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**Biotic Cultural Resources:
Management Considerations for Historic Districts
in the National Park System, Southeast Region**



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BIOTIC CULTURAL RESOURCES: MANAGEMENT CONSIDERATIONS FOR
HISTORIC DISTRICTS IN THE NATIONAL PARK SYSTEM, SOUTHEAST REGION

by Ian J. W. Firth
School of Environmental Design
University of Georgia
Athens, Georgia 30602

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Cumberland Island National Seashore

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Fort Frederica National Monument

Great Smoky Mountains National Park

Horseshoe Bend National Military Park

Natchez Trace Parkway

Shiloh National Military Park

Vicksburg National Military Park

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INTRODUCTION

Biotic cultural resources are communities of plants and animals associated with human settlement and land use in historic districts. Such landscape features as gardens, orchards, woodlots, fields, ponds and pastures are biotic resources as distinct from the buildings, structures and objects of a historic district which are abiotic resources. Because these biotic features are products of land use and management, they are cultural resources; they are distinct from the native vegetation and wildlife of a historic district, which are natural resources.

Existing NPS guidelines for the management of historic districts do not address the unique characteristics of biotic cultural resources. Some, such as pastures, have been classed as natural resources; others, such as gardens, have been classed as structures. The usual approach to their preservation has been to restore them to the general appearance of a historic scene. There are no guidelines or standards applying to this. As a result, considerable attention has been paid to historical authenticity in some cases while in others it has been neglected.

In principle, biotic cultural resources have a historical significance equal to that of historic buildings, structures and objects, and their preservation should be guided by equivalent standards. The aim of this report is to provide some considerations for preserving biotic cultural resources within the framework of the Cultural Resources Management Guideline (NPS 28). The recommendations are based on a review of existing management issues and practices within the NPS Southeast Region.

Sections one and two describe the unique character of biotic cultural resources, the distinctions between the preservation of natural and cultural resources and the differences between biotic and abiotic cultural resources.

In section three, standards for the preservation and restoration of biotic cultural resources are recommended, based on the concept of integrity.

Section four discusses the evaluation of historical significance, using examples from the Southeast Region.

The feasibility of a preservation or restoration strategy depends on the available historical information, an ability to recover past characteristics and to maintain those characteristics. In sections five, six and seven, these issues are examined with reference to preservation and restoration projects in the Southeast Region.

Where it is not feasible to preserve or restore a biotic cultural resource, alternative ways of managing a landscape must be found. Section eight discusses three alternatives: replacement with an equivalent community, replacement with a grassland community, and release to allow the return of native vegetation and wildlife.



Fig. 1 The goat barn and pasture at Carl Sandburg Home.
In this historic landscape the pasture, pond, goats and ducks should
be managed as biotic cultural resources.
Photo: no date (1970s), in the collection of Carl Sandburg Home NHS.

SECTION ONE

NATURAL AND CULTURAL RESOURCES

Definitions

A clear understanding of what is natural and what is cultural is essential for us to appreciate the historical characteristics of a place. This distinction should be reflected in different approaches to the management of natural and cultural resources in historic districts.

All historic landscapes evolved from and depend on natural resources - interconnected systems of land, air and water, native vegetation and wildlife. Human settlement and land use altered many of these systems, some deliberately by construction and management activities, others only accidentally. Those features of a landscape which were the result of construction and management in a historic period should be classed as cultural resources. This includes biotic communities such as gardens, orchards, fields, ponds, pastures and woodlots, and includes all their plant and animal populations. Those features of a landscape which escaped deliberate alteration, although affected by man's presence in a historic period, should be classed as natural resources. This includes any indigenous vegetation and animal life which were not managed in that period.

Preservation Goals

Natural resources in historic districts should be preserved in their pristine condition. No attempt should be made to replicate the chance, usually destructive impacts of man's historical presence. Cultural resources, on the other hand, should be preserved in their historic condition as physical evidence of man's activities during a particular historic period.

Natural Resources Protection

In theory, a "hands-off" policy is required for the preservation of natural resources, but in practice some form of management is often necessary to restore

these resources to their pristine condition and protect them from further disturbance by human activities. This protective approach means we must accept natural changes in a historic landscape. This involves not only daily and seasonal cycles in native vegetation and wildlife, but permanent changes which are an inherent part of the development of natural systems. Some changes may be imperceptible to the casual observer; other changes, particularly in a coastal environment, may have an immediate and drastic effect. Where permanent changes affect our ability to understand historical events, it is desirable to record and, if possible, to mark the historic configuration of natural features. But any interference with natural processes would alter the natural character of these resources.

An important exception to this "no interference" policy must be made where natural processes threaten cultural resources in a historic district. For example, periodic wildfires in native vegetation communities can threaten historic buildings and structures. In such cases, the feasibility and consequences of control measures must be considered. The aim should be to find the minimum level of control of natural processes necessary to ensure the survival of cultural resources.

Cultural Resource Preservation

In contrast to the protection of natural resources, the preservation of cultural resources requires continuous interference with natural processes. Changes which would alter the physical characteristics of a cultural resource must be controlled. This does not mean we should prevent cyclical changes which are an integral part of the character of cultural resources, particularly those that are biotic, but rather we should prevent permanent changes which would transform the cultural resource.

Just as the protection of the natural character of natural resources must be compromised where cultural resources are threatened, so the preservation of the historic character of cultural resources must be compromised where environ-

mental impacts are unacceptable. This applies particularly to the management of biotic cultural resources and is considered further in the analysis of maintenance strategies in section 7. The aim should be to find the minimum level of alteration to the historic character of cultural resources compatible with the conservation of natural resources.

The goal of preserving the historic physical characteristics of cultural resources applies to both biotic and abiotic cultural resources, but there are essential differences between the two. These differences are outlined in the next section.

Section One References

1. U.S. Department of the Interior NPS 1975. Management Policies Washington, D.C.
2. U.S. Department of the Interior NPS 1978. Management Policies Washington, D.C.
3. U.S. Department of the Interior NPS 1981. Cultural Resources Management Guideline (NPS 28) Washington, D.C.
4. White, Peter S. and Susan P. Bratton 1980. "After Preservation: Philosophical and Practical Problems of Change" Biological Conservation 18 (241-255).

SECTION TWO

BIOTIC AND ABIOTIC CULTURAL RESOURCES

Preservation, Restoration and Reconstruction

The NPS has defined three strategies for the preservation of cultural resources. Preservation is "the act or process of applying measures to sustain the existing terrain and vegetative cover of a site and the existing form, integrity and material of an object or structure. It includes initial stabilization work, where necessary, as well as ongoing maintenance" (NPS 28, Chapter 1, p. 12).

Restoration is "the act or process of recovering the general historic appearance of a site or the form and details of an object or structure, by the removal of incompatible natural or human caused accretions and the replacement of missing elements. Restoration can be for exteriors and interiors, and may be partial or complete" (NPS 28, Chapter 1, p. 13).

Reconstruction, the third strategy, is not endorsed by the NPS except in special cases. It may be defined as "accurately recreating a (cultural resource) which no longer exists to its original appearance or to its appearance at a given point in its history . . . Reconstruction can be full or partial" (NPS 28, Chapter 1, p. 13).

These three strategies can be applied to both abiotic and biotic cultural resources, but the processes involved are very different.

The preservation of abiotic cultural resources - buildings, structures and objects - focuses on the retention of materials from a historic period in their proper structural arrangement. A structure is isolated as far as possible from the natural agents of decay. Alterations to the form of the structure by reconstruction are prohibited.

A different approach must be taken to the preservation of biotic cultural resources. The preservation of individual plants and animals is not feasible; their lives may sometimes be prolonged, but they cannot be perpetuated. Only their skeletal remains can be preserved by techniques similar to those used in the conservation of abiotic objects. However landscape features formed by communities of plants and animals (such as gardens, orchards, pastures, etc.) can be preserved. This requires the regeneration of their component populations and a continuation of their organization through the application of historic management techniques.

In short, while the preservation of an abiotic cultural resource focuses on the retention of historic materials and architectural structure, the preservation of a biotic cultural resource should focus on the retention of historic plant and animal populations and community organization.

Restoration of a building, structure or object may involve the removal of additions made since a historic period and the replacement of lost parts of a structure with materials matching the historic fabric. Restoration of a biotic cultural resource, on the other hand, may involve the removal of plant and animal populations which have invaded a community or been deliberately introduced since a historic period, and the replacement of lost members of a community with plants or animals matching the historic population.

Reconstruction of a building or structure involves the reproduction of missing elements, at full scale and on the original site. Reconstruction of a biotic cultural resource would involve the reintroduction of historic plant and animal populations to recreate a historic community on the original site.

The distinction between restoration and reconstruction of a biotic cultural resource hinges on the presence of historic plant or animal populations on a site. Where any of the historic populations are still represented, a recovery of the

rest of the community may be considered as a restoration. (In the case of annual plant populations grown in rotation in fields and gardens, the presence of any of the populations within the rotation qualifies.) Where none of the historic populations remain, a reproduction of a historic community should be considered as a reconstruction.

Preservation Standards

The NPS has established preservation, restoration and reconstruction standards for historic structures, but not for managed biotic communities. References to the general appearance of a historic scene are clearly inadequate.

Standards for biotic cultural resources, like those for historic structures, should be based on the concept of integrity. This is examined in Section Three.

Section Two Reference.

1. U.S. Department of the Interior NPS 1981. Cultural Resources Management Guideline (NPS 28), Washington, D.C.

SECTION THREE

THE INTEGRITY OF BIOTIC CULTURAL RESOURCES

Definition

Integrity refers to the authenticity of the historic identity of a cultural resource, which is evidenced by the survival of physical characteristics from a historic period. This concept, applied in the preservation of historic buildings and structures, should also be applied in the preservation of biotic cultural resources.

Historic Period

The integrity of a cultural resource is evaluated by comparing its present physical characteristics to those of a historic period. In this comparison the state of a resource at the end of a historic period is usually taken to define its historic condition. But there are exceptions to this rule. For example, in a Revolutionary or Civil War battlefield, it is usual to designate the landscape as it existed immediately before the action as a historic scene. This allows us to understand the influence of the terrain and vegetation on the military action, but it does not require a record of the random destructive impacts of battle.

Evaluation Criteria

The National Register of Historic Places evaluation process provides criteria for assessing the integrity of historic districts, sites, etc. These criteria were developed primarily for buildings, structures and objects and need to be redefined to apply to biotic cultural resources. There are seven aspects of integrity, namely location, design, setting, materials, workmanship, feeling and association. In applying these to biotic cultural resources, it is necessary to consider species composition, community organization and management techniques rather than material, design and workmanship. The seven aspects of integrity as they apply to biotic cultural resources are defined below.

Location

Location is the geographic distribution of a biotic cultural resource. Changes

usually occur through a migration of boundaries. The edges of managed biotic communities are often clearly defined. Many communities such as gardens, orchards and fields are usually fenced. But the historic limits of some communities, such as woodland pastures in which livestock were allowed to range freely, may be difficult to define.

Cultural resources must be preserved in their historic locations if we are to understand the past. The idea of a historic place links history to geography. It is important therefore to identify any change in the boundaries of historic biotic communities.

Species Composition

A managed biotic community is usually composed of a mixture of native and introduced species. It is very difficult, if not impossible, to catalogue all the species in a biotic community, and this is not necessary. Instead, the dominant and the introduced species, which were the focus of management activities in a historic period, should be the focus for inventory and preservation. This inventory should identify not only the species, but also the varieties of plants and breeds of animals. Where possible, the origins of introduced species and the histories of varieties and breeds should be known. This should be accompanied by a description of their physical characteristics - in form, growth and reproduction.

These characteristics are transferred from generation to generation, though only a clone is genetically identical to its parent. While cloning is practiced in some branches of agriculture, horticulture and silviculture, the normal variations resulting from sexual reproduction are vital to the maintenance of healthy plant and animal populations. A comparison between the past and present characteristics of the plants and animals within a community, should focus, therefore, on distinctive varietal characteristics while allowing for normal variations between individuals.

Community Organization

The organization of a community can be described in terms of the size, structure and distribution of each of its plant and animal populations, plus the cyclical patterns in these characteristics. The exact format for this description varies with the type of plant or animal population.

The size of a population can be derived from a count of individuals or from an estimate based on area occupied. For example, trees in an orchard and livestock in a pasture can be counted, while the size of grain crops is given as an acreage accompanied by a yield per acre. An analysis of a population structure may consider divisions based on age, size, sex or other characteristics that affect the management of the plants or animals. Distributions may be described in terms of a fixed layout, a general density or a movement between points. For example, the pattern of corn in a field can be described with some precision - by the number of plants per hill and the spacing of the hills and rows. But the distribution of sheep can only be described in general terms - they may have been penned in the winter and released to forage in woods during the summer.

Many cyclical patterns affect the size, structure and distribution of plant and animal populations. These cycles are controlled by natural rhythms and by management. For example, we have daily and seasonal cycles in the movement of livestock, annual cycles in the replanting of vegetables and the regeneration of most livestock, a four- or five-year cycle in the rotation of some field crops, and a longer cycle in the replacement of old and damaged trees in an orchard.

When we compare historic population patterns with those of the present, it is important to distinguish these cyclical changes from permanent developments. If the present population characteristics are different from the historic ones, it may be because the population is in a different phase of a normal cycle.

Management Techniques

The species composition and community organization of a biotic cultural

resource are controlled by constant management activity. Agriculture, horticulture, silviculture and other land management systems employ a variety of techniques, which can be described under five headings:

- regeneration - including the maintenance of population numbers and promotion of desirable characteristics by selection of parent stock;
- intermediate care - such as the cultivation of crops, thinning of timber and feeding of stock;
- protection - the prevention of losses to weather, disease, insect and animal predation;
- harvest - the optimization of production by controlling the length of the life cycle and determining the place and time of harvest;
- use - including the conservation and consumption of the products.

Ornamental patterns of plants and animals are essentially the same as agricultural patterns but without the same concern for harvest and use.

The physical characteristics of a biotic community reflect the management techniques and standards, the types of equipment used and the timing of the various activities. Often these technical details are peculiar to a time and place, whereas the overall land management system may be common to several periods and locations.

Setting

The setting is the physical environment of a managed biotic community. It includes natural resources - landforms, streams, natural vegetation, wildlife, etc. - and cultural resources - both other managed biotic communities and buildings, structures and objects. This physical setting is vital to the functioning of a community. Natural resources of land, air and water provide the framework for

the growth and development of the plants and animals. Neighboring communities provide competing or complementary populations, while buildings and structural site improvements facilitate various management activities.

A comparison between the setting in the past and in the present should not be restricted to the immediate environs of a community, but should include all features associated with its management.

Feeling

Feeling refers to the ability of a cultural resource to evoke a sense of the past. All the senses are engaged in the perception of biotic communities. Sounds and smells can be as evocative as views. But particularly important is a sense of rhythm: an awareness of the pulse of the community. The character of a living community of plants and animals cannot be appreciated without experiencing its various biological rhythms: diurnal, monthly and seasonal. And the management of a biotic community in each historic period and place had its own tempo; it is this which can speak most strongly of times past.

An evaluation of the integrity of a community in this sensory aspect can be based on an assessment of its integrity under the first five criteria - location, species composition, community organization, management techniques and setting.

Association

Association refers to the connection between a biotic community and the people, events or developments of a historic period. This quality is a summation of the previously defined categories of integrity. It is important to assess whether the cumulative effect of changes in the previous six categories is such that the connection to the past has been severed.

An overall evaluation of the integrity of a managed biotic community can be made by a comparison of its appearance in the historic period and the present.

However, we should remember that even when a community survives intact, an exact repetition of its appearance at any particular moment can only occur periodically, because of normal cyclical patterns in populations. A repetition of a historic scene composed of several plant and animal communities requires a conjunction of all biotic cycles in their appropriate phases. Therefore, like Halley's Comet, a particular historic scene may return perhaps once in a lifetime.

Preservation Standards

When an evaluation of the integrity of a biotic cultural resource indicates that sufficient historic characteristics remain to convey the historical associations of the place, then those characteristics should be preserved.

The standards guiding the preservation of a biotic cultural resource should be equivalent to those established for historic structures.

Before any preservation work is implemented, a sound historic and scientific investigation of the biotic community should be conducted. A preservation guide should then be prepared. All work relating to the regeneration of historic plant and animal populations should be preceded by a study that adequately ensures that inherent research and interpretive values are not lost.

The aim of preservation is to retain the existing integrity of the biotic cultural resource; it should not include any substantial restoration. Shifts in the boundaries of a community are to be accepted, but further changes should be prevented.

Lost populations of plants and animals should not be reintroduced and those added since the historic period need not be removed, except where the maintenance of remaining historic characteristics requires a reintroduction of missing populations or a control of competing species. When historic population characteristics - number, structure and distributions - can be recognized, these should be maintained, but where these patterns have been lost they need not be restored. A return

to a historic management system is not required, but historic populations should be managed by the historic techniques when feasible. Further disintegration of the historic setting - of both its natural and cultural components - should be prevented as far as possible.

This strategy recognizes that changes which have taken place since the historic period provide evidence of the passage of time. Where these changes have not severed the association with the historic past, they should be accepted.

Restoration Standards

"Restoration may take place only when such work is essential for public understanding and appreciation of the historical or cultural associations of the park and when adequate interpretation cannot be imparted through any other means" (NPS 28, Chapter 2, p. 6) .

The standards guiding restoration of a biotic cultural resource should be as rigorous as those established for historic structures. Historical data should be sufficient to permit an accurate restoration with a minimum of conjecture. Every restoration should be preceded by a detailed study that adequately documents the biotic cultural resource.

Any changes made during restoration should be carefully documented and surviving historic plant and animal populations should be safeguarded during and after restoration.

The aim of restoration should be truth to the historic characteristics and not merely recovery of a "general appearance". A restoration of historic boundaries should follow the historic alignment. Any plant or animal populations reintroduced should have all the physical characteristics of the original varieties or breeds. A restoration of historic community organization should be accurate with respect to the size, structure and distribution of each population. A return to historic management techniques should meet the same standards, employ the same types

of equipment and follow the same calendar as those of the historic period. A recovery of the historic setting should, as far as possible, restore the natural resources of the historic period to their pristine condition and protect them from further disturbance by human activities. A restoration of the structural components of a setting should follow existing NPS guidelines.

Restoration may be partial or complete. Complete restoration is the recovery of all the physical characteristics of a historic resource. Partial restoration is selective; it restores only those characteristics which are essential for public understanding of the significance of the original. For example, a partial restoration of an orchard may restore the fruit trees but accept change in the ground cover vegetation. Where a partial restoration is planned, the effects of the changed community composition on the restored populations should be considered in deciding the extent of restoration necessary.

Only an accurate restoration can recover the historic characteristics of a biotic cultural resource and properly convey the historical and cultural associations of a place.

Reconstruction Standards

"Reconstruction shall be undertaken only if such work is absolutely essential for public understanding and only if the subject (cultural resource) is associated with a site's primary theme. In addition all prudent and feasible alternatives to reconstruction must be considered and it must be demonstrated that reconstruction is the only alternative that permits an appreciation of the historical or cultural association for which the park was established" (NPS 28, Chapter 2, p. 7). The prohibition of reconstruction except in these limited circumstances should apply to biotic cultural resources as well as to structures.

The standards guiding reconstruction work with respect to the adequacy of historical data and accuracy in the reproduction of historic characteristics should

be equivalent to those defined for restoration.

Application

The objective of preservation and restoration is to convey the historical or cultural associations of a park or historic district. The issue of historical significance is examined in Section Four.

The feasibility of preservation and restoration projects depends upon:
the availability of data on historic characteristics,
the degree of disturbance since a historic period, and
the development of an appropriate maintenance strategy.

These issues are examined in Sections Five, Six and Seven.

Section Three References

- Melnich, Robert Z. 1984. Cultural Landscapes: Rural Historic Districts in the National Park System USDI NPS, Washington, D.C.
- U.S. Department of the Interior, NPS 1981. Cultural Resources Management Guideline (NPS 28), Washington, D.C.
- U.S. Department of the Interior, NPS 1982. How to Apply the National Register Criteria for Evaluation (Draft) Washington, D.C.

SECTION FOUR

HISTORICAL SIGNIFICANCE

Evaluation

It may not be necessary to preserve a complete historic scene in order to convey the historical or cultural associations of a historic district. Preservation and restoration should focus on historically significant features. Congress in the legislation establishing a park may have defined the significance of a district, or it will have been described in the course of nomination to the National Register of Historic Places. This Register recognizes four types of historical significance:

- association with historic events,
- association with historic persons,
- illustration of types of design or construction, and
- provision of information on history or prehistory.

Some districts have more than one type of significance, and in these cases primary themes are distinguished from secondary themes.

The significance of the physical characteristics of biotic cultural resources should be evaluated by an assessment of their relevance to those themes.

Association with Historic Events

This is the most common category among Southeastern districts. It includes single events such as the Revolutionary and Civil War battles, and series of events such as the colonial settlement of the seaboard and movements westward through the Appalachians. The influence of biotic cultural resources on such events was often direct.

For example, Chickamauga-Chattanooga NMP was established for the "purpose of preserving and suitably marking for historical and professional



Fig. 2. A clearing in the woods at Chickamauga.
The character of vegetation on this battlefield had a significant effect on the conduct of the battle.
Photo: no date (early this century), in the collection of Chickamauga and Chattanooga NMP.

military study the fields of some of the most remarkable maneuvers and most brilliant fighting in the War of the Rebellion" (1890 Act quoted in Interpretive Prospectus, 1982).

Those maneuvers were mostly chaotic. The dense woods were matted with underbrush probably as a result of agricultural disturbance. This took the battle out of the hands of the commanders, the use of artillery was restricted and there were numerous charges and unexpected events. Open fields and orchards became the scene of the heaviest casualties as advancing soldiers were subject to devastating volleys. So the boundaries of woods and fields are of great historical significance. The composition of the woods played a central role. In the fields, the details of crops and orchards were less important to the conduct of the battle. They are of interest, however, in relation to a secondary theme of the park - the impact of the war on the lives of civilians caught in its path of destruction.

Association with Historic Persons

Some districts may be places where historic persons made their contributions to the history of the nation, or the homes from which they came and to which they retired. In these districts, it is often difficult to isolate particular features of a landscape as being more significant than others.

For example, at Carl Sandburg Home NHS, the farm and forest landscape provided an idyllic setting for the last 22 years of the author's life. Sandburg was essentially an observer, as he did not play an active role in the management of the farm. He usually spent his evenings strolling around the farm or along forest trails, delighting in their sights and sounds. It is therefore the feeling of the landscape as a whole which has historical significance.

Illustration of Types of Design or Construction

The terms "design" and "construction" tend to focus attention on the buildings and structures within a district, but they can also refer to distinctive



Fig. 3. Carl Sandburg at Connemara.
The landscape of this farm provided an idyllic setting for the last 22 years of the author's life.
Photo: June Glenn Jr. - no date.

land use systems. Unlike buildings and structures, land use systems were seldom designed and constructed by a single individual. They were usually the work of a group of people and reflected that group's history and culture. Examples in the Southeast range from the humble farms of Appalachia to the estates of the wealthy on Cumberland Island. In some cases, it is possible to select a particular feature as representative of distinctive land use practices, but in other cases the entire landscape has significance in this context.

At Hensley Settlement in Cumberland Gap NHP, the characteristic frugality and ingenuity of the settlers could be seen in their use of all the resources of their mountain home. This was a 20th century community but with a material culture similar to that of the early pioneers. The Settlement was isolated on a high plateau and remained almost self-sufficient. The physical characteristics of all the biotic communities on each farm - orchards, vegetable gardens, cornfields, woodlands and pastures - are equally significant within this context.

Provision of Information on History or Prehistory

Districts in this category are primarily associated with archaeological research, in which the emphasis is on the study of biotic remains rather than living communities of plants and animals. However the scientific value of the latter to historians should not be overlooked. For example the composition and population structure of woodlands, pastures, hedgerows, etc. can provide valuable information on past land use practices. But this scientific value is reduced when there is a history of disturbance, which is generally the case in the Southeast.

Selection

In districts in which the whole landscape is considered historically significant, it may be desirable to preserve or restore an entire historic scene.



Fig. 4. Willie Gibbons' Farm at Hensley Settlement.
The design and operation of the farm illustrate the characteristic self-sufficiency of this isolated mountain community.
Photo: William Cox, 1975, in the collection of Cumberland Gap NHP.

However, this is seldom feasible and a more selective approach is often necessary.

It may be possible to select within a larger landscape an area which contains a representative cross-section of the significant resources. For example one farm at Hensley Settlement - the Willie Gibbons Farm - was selected to represent the land use patterns typical of the entire settlement. The park has developed this farm as a Living History Farm. A couple of adjacent farmsteads have been partially restored, but a large part of the plateau was left as it was when the NPS acquired the property - abandoned to revert to forest.

It may also be necessary to reduce certain populations to token numbers - representing the composition but not the organization and management of biotic cultural resources. For example, at Carl Sandburg Home the 1971 Master Plan called for the restoration of the entire goat farm. But this proved over-ambitious. It was not possible to manage the goats along historic lines. Difficulties were encountered in maintaining the pedigree herd and marketing the dairy products. So in 1978 the herd was reduced to a token number and no attempt is made to maintain the herd's registration.

Interpretive programs need not be dependent on the total recovery of a historic scene. A wide variety of methods can be used to assist public understanding of the historical significance of a place. Visitors should be presented with the processes as well as the products of historical research.

Section Four References

Department of the Interior NPS 1982 Chickamauga and Chattanooga NMP
Interpretive Prospectus, Harpers Ferry Center.

Department of the Interior NPS 1970. Carl Sandburg Home NHS N. Carolina
Interpretive Prospectus.

Department of the Interior, NPS 1971. Carl Sandburg Home NHS N. Carolina
Master Plan.

Department of the Interior, NPS 1971. Cumberland Gap NHP Ky/Va/Tenn
Interpretive Prospectus.

Cox, William E. 1978. Hensley Settlement A Mountain Community. Eastern
National Park and Monument Association.

SECTION FIVE

HISTORICAL RESEARCH

Sources

Preservation and restoration projects must be guided by adequate historical data. An assessment of the integrity of a biotic cultural resource requires a scientific study of its present characteristics coupled with research to define its historical physical characteristics.

The historical research should draw on a variety of sources, including old maps and surveys, written accounts, photographs, oral histories, archaeological investigations and the historical evidence provided by the present community. None of these sources by itself can be relied upon to provide an accurate and complete picture of a cultural resource. It is essential to cross-check information from all these sources.

Historical Maps and Surveys

The most common types of historical surveys are military maps, topographic surveys, coastal charts, plats and architectural plans. The usefulness of a survey depends on its date in relation to a historic period and the purpose for which it was made. Few historical surveys provide much information on the composition of biotic communities; most are useful only to determine boundaries of major communities such as fields and forests. The reliability of these surveys must be ascertained by cross-checking them with written accounts. For example, when Shiloh NMP was established in 1896, maps were made showing the layout of the battlefield in 1862. In 1973, to guide a restoration program, these maps were cross-checked with accounts of the battle in the Official Records of the Union and Confederate Armies, veterans' memoirs and various secondary sources. Corrections and additions were made to the 1899-1900 maps to provide a more accurate historical base map.

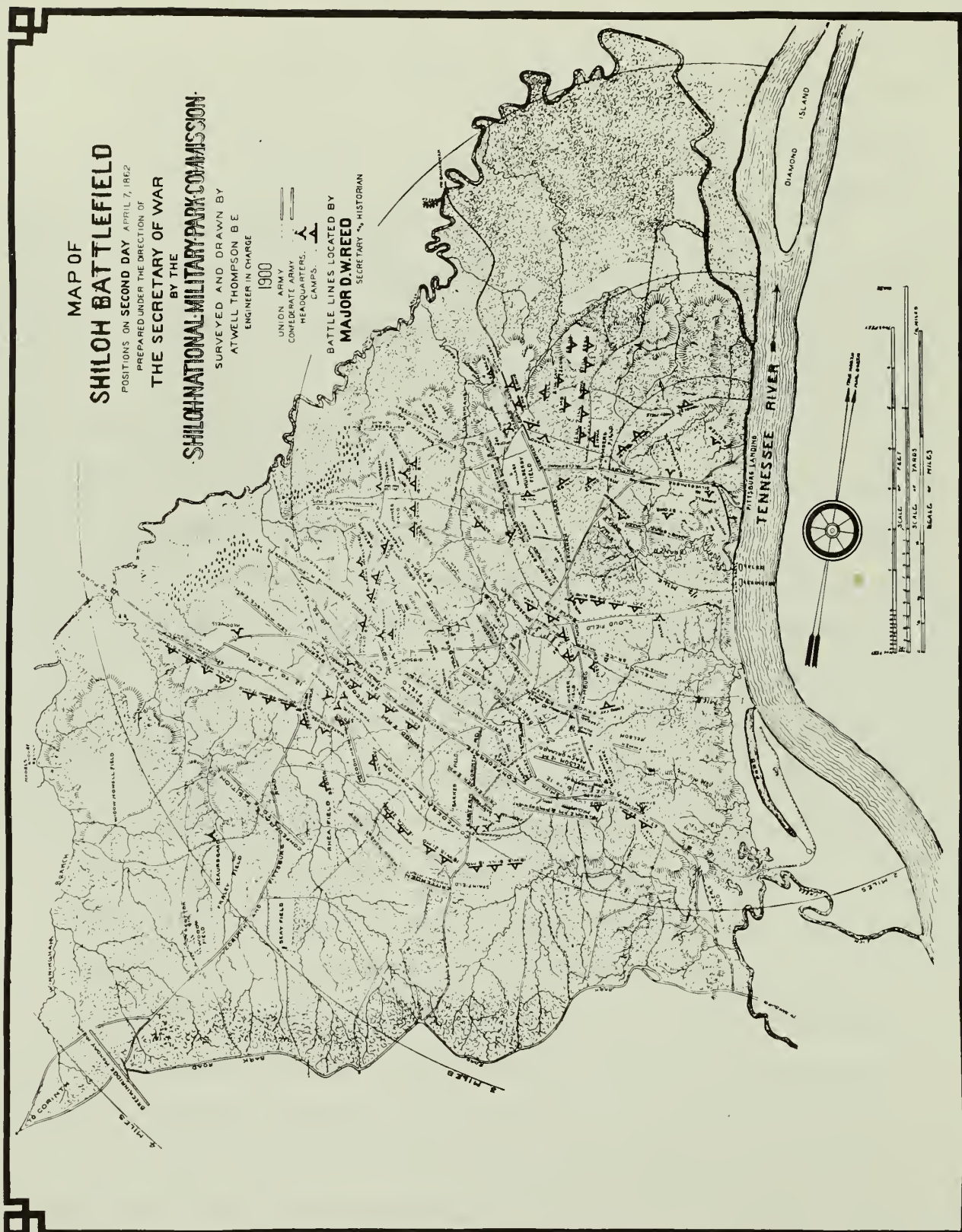


Fig. 5. Shiloh Battlefield, positions on second day, April 7, 1962.
This is one of the historical base maps prepared when the park was established. Corrections and additions were made to these base maps in 1973, to guide a program which restored most of the fields to their historic configuration.
Map: A. Thompson and D.W. Reed, 1900, in the collection of Shiloh NMP.

Historical Written Accounts

Censuses provide statistics on agricultural production in each county. More detailed accounts may be available in land management records. These are more likely to have been kept on large estates than small farms. More general descriptive accounts in journals, letters, newspapers, etc. are useful to the extent the authors paid attention to biotic communities. For example, some of the early colonial accounts are informative because the authors were interested in the agricultural potential of the land, whereas most military accounts only mention features of the terrain which influenced the conduct of a battle. Where accounts are incomplete it may be possible to infer some details. For example, at Shiloh the spacing of peach trees in an orchard has been deduced from the absence of any mention of the trees as an impediment to movement during the action. The spacing has been estimated from the turning radius of a cannon limbered up with a six-horse hitch.

Photographs

Photographs are not as selective as written accounts. In addition to those taken as a deliberate record of a scene, many family snapshots are a rich source of information. The evidence from a collection of photographs taken from different vantage points at about the same time can be pieced together to decipher vanishing landscape features. This has been done on Cumberland Island NS to discover the layout of the Carnegie gardens at Dungeness. Repeat photographs taken from the same vantage point at different times are valuable as a record of changes in a landscape. Aerial photographs, available for the past 50 years, make possible a detailed analysis of vegetation communities. Large-scale aerial photographs can play an important role in guiding field investigations, revealing features not readily apparent from the ground. At Dungeness, for example, the layout of the paths now overgrown



Fig. 6. Flossie Carnegie's wedding at Dungeness, Cumberland Island.
The layout of the gardens at Dungeness during the Carnegie period
can be determined from a collection of family photographs.
Photo: 1901 in the collection of Cumberland Island NS.

by lawns is clearly visible on aerial photographs.

Oral History

The most detailed accounts of managed biotic communities have been pieced together from interviews with past residents of historic districts. For example, a detailed account of farming practices at Hensley Settlement in Cumberland Gap NHP has been assembled from interviews with surviving members of the Hensley and Gibbons families. This research relies on memory or stories passed down within families and is obviously most applicable to the rediscovery of the recent past. It is important to link interviews to available maps and photographs so that geographic references can be understood. It is also desirable to interview enough people so that different viewpoints can be obtained and details cross-checked.

Archaeological Investigations

The management of plants and animals may leave several kinds of remains - artifacts, structures, disturbed soil profiles and biotic remains. Artifacts such as farm and garden implements can indicate management techniques. Structural remains and disturbed soil profiles are particularly useful for indicating site layout. Biotic remains such as bones, seeds, roots, etc. can provide evidence of the species composition of past communities as well as distribution patterns. Archaeological investigations are most productive in areas which have been released rather than redeveloped. At Fort Frederica NM, for example, although archaeological research has yielded some evidence of the layout of the lots within the settlement (post holes and brickwork indicate the position of fences between gardens), the long history of disturbance during the plantation era is a major handicap to this type of research.

Study of the Present Community

Living communities of plants and animals can retain traces of past manage-



Fig. 7. Archaeological investigations at Fort Frederica.
Fieldwork has revealed some structural remains indicating the layout of the lots within the colonial town; but the long history of post-colonial disturbance on this site is a major handicap to this type of research.
Photo: 1958, in the collection of Fort Frederica NM.

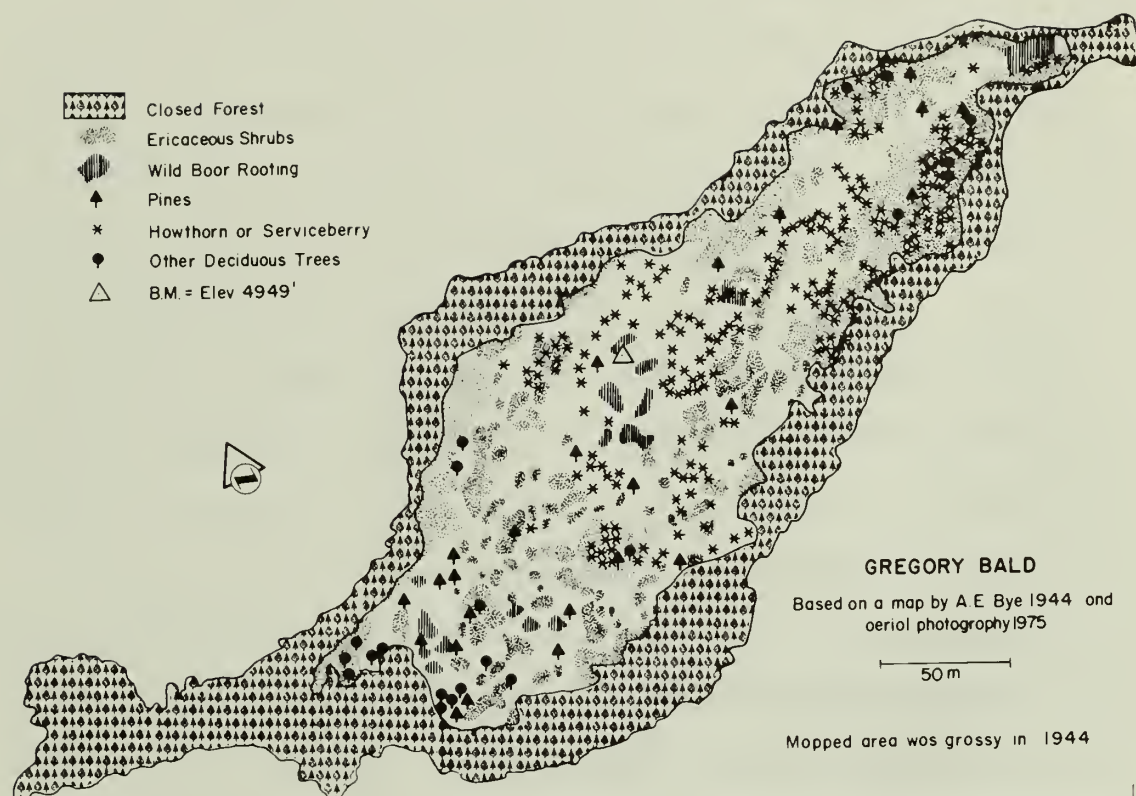


Fig. 8. Vegetation survey of Gregory Bald, Great Smoky Mountains.
 The map shows the extent of the invasion by woody plants since grazing
 was discontinued on this grassy bald.
 Map: Mary Lindsay, 1977, Uplands Field Research Laboratory, Great
 Smoky Mountains NP.

ment many years after the management has been discontinued, particularly if these communities have been released rather than redeveloped. These traces of past management may be seen in species composition - such as the presence of relict populations of introduced species - and in population patterns - such as geometric plant distributions or a uniform age class structure. Because of the dynamic character of biotic communities, "reading" this type of evidence is a complex task and fieldwork needs to be linked to the other types of historical research. In Great Smoky Mountains NP, for example, a study of the history of two grassy balds was begun in 1975. Fieldwork determined the present species composition of each bald and compared it to other high mountain areas with a known history of disturbance by grazing, mowing, fire or trampling. An archival search with an analysis of old photographs, plus interviews with people who had herded livestock on the balds, documented the historical character of the balds before the park was established. From this evidence, the rate of invasion of the grassy balds by woody plants and the resulting loss of integrity could be assessed. While the origins of the balds may still be disputed, this study confirmed the historical importance of grazing in maintaining the grassy balds and the threat to their survival once grazing was discontinued.

Conclusion

The aim of a historical research program is to minimize conjecture in preservation and restoration projects. The degree of precision necessary in a description depends on the historic characteristics. For example, in a historic period a boundary may have been a line defined by a fence or ditch, or it may have been a transition zone, say between a grassy pasture and woodland pasture. A population may have been tightly organized into linear patterns like trees in an orchard or vegetables in a garden, or only loosely organized

with respect to distribution like trees in a woodlot or livestock in a pasture.

The precision of the historical description should reflect the degree of organization in a historic period.

Where research cannot provide a site-specific description, it may be necessary to turn to general accounts of a locality and period. These sources can be used to define common characteristics but cannot substitute for site-specific data. They are useful only as a guide to more site-specific research. A general description should not be used as a basis for restoration as it does not identify the particular characteristics of a time and place.

Where historic physical characteristics cannot be defined adequately, the preservation, restoration or reconstruction of those characteristics cannot be undertaken.

Section Five References

U.S. Dept. of the Interior NPS. 1973. Historical Base Map Shiloh National Military Park and Cemetery Shiloh Tennessee. Prepared by Edwin C. Bearss, Denver, Co.

Reaves, George A. 1982. A Report to Determine the Size and Condition of the Peach Orchard at the Intersection of the Sunken Road and Pittsburgh Landing Road on April 6, 1862. Shiloh NMP.

Zeichner, Lauren L. The Historic Landscape of Dungeness, Cumberland Island NS, Georgia. (in preparation)

Munck, Robert W. (no date) A Brief History of Hensley Settlement Cumberland Gap NHP.

U.S. Department of the Interior NPS 1972. Farm Management Plan Hensley Settlement Cumberland Gap NHP.

Manucy, A.C. 1962. The Fort at Frederica. Notes in Anthropology vol. 5. Fla. State University.

Lindsay, Mary 1976. History of the Grassy Balds in Great Smoky Mountains National Park. U.S. Dept. of the Interior NPS Southeast Region Uplands Field Research Laboratory Management Report no. 4.

Lindsay, Mary. 1977. Management of grassy balds in Great Smoky Mountains National Park. U.S. Department of the Interior NPS Southeast Region Uplands Field Research Laboratory Management Report No. 17.

Lindsay, Mary and Susan P. Bratton, 1979. "Grassy Balds of the Great Smoky Mountains: Their History and Flora in Relation to Potential Management." Environmental Management Vol. 3, No. 5, pp. 417-430.

SECTION SIX

DISTURBANCE AND RECOVERY

Disturbance

The feasibility of a preservation or restoration strategy depends on the degree to which a biotic cultural resource has changed since a historic period. As disturbance increases, the problems of stabilization or recovery multiply. Disturbance is caused by changes in management in response to natural or socio-economic factors. Many sites have undergone a series of redevelopments interspersed with periods of release. Both types of disturbance set in train a complex sequence of changes in biotic communities.

Redevelopment is associated with technical advances in land management and changes in land use. The adoption of labor-saving machinery, the use of artificial fertilizers and pesticides, site improvements to facilitate regeneration, care and harvest - all produce changes in the organization of a biotic community. Progress is often accompanied by the introduction of improved varieties or breeds with a change in population characteristics. A change in land use - for example, as forests or pastures give way to the plow - involves the most drastic disturbances. Existing plant and animal populations are displaced, new populations are introduced and the site altered to accommodate the new inhabitants. Once a community has been replaced, the biotic links with the past are broken.

Release occurs when the land is neglected and falls into disuse due to social or economic reasons. Community boundaries become obscured as vegetation succession replaces cleared fields with scrub and eventually forest. Introduced plants and animals may become feral and scatter beyond their historic confines. Structural site improvements decay and disintegrate. But the alteration of the land in the historic period may operate against a full

reestablishment of native flora and fauna. Some biotic continuity from a historic period remains until the last of the relict populations is eliminated.

Districts associated with events in the more distant past have usually suffered the most disturbance. At Fort Frederica NM, for example the site of the settlement has undergone at least three cycles of release and redevelopment since the end of English occupation in the 1740s. As a result, little of the present vegetation around the townsite reflects colonial activities.

Recovery

Where a site has been much disturbed, restoration may be essential for public understanding and appreciation of its historical or cultural associations. However, the recovery of biotic communities can present a number of difficult problems.

Returning a community to its historic boundaries may bring conflicts with other land uses. The boundaries of historic districts are often drawn with reference to a group of structures or to the site of a historic event, and without regard to land management patterns.

Reintroduction of historic types of plants and animals requires a source for the authentic varieties and breeds. The removal of successional vegetation which has invaded abandoned areas can be a major undertaking. Exotic species introduced since a historic period also must be removed, and this may prove to be an intractable problem. Regeneration of a historic community, such as a mature woodland, may take decades and it is difficult to accelerate this process. A return to historic management techniques requires a labor force of the same size and with the same skills as the historic workforce. It is often difficult or impossible to completely recover a historic setting. Changes to the site as a result of soil erosion, air pollution, alterations in stream flow or water table etc. may be irreversible. The recovery of the structural com-

ponents of the setting - restoring fences, ditches, barns, etc. and removing anachronistic structures - often accounts for a large part of the initial cost of a restoration project. In recapturing a feeling of the past, much depends on the recovery of this setting.

Many of these problems can be seen at Cowpens NB. In 1781, the battlefield was a woodland pasture, an oak, hickory, chestnut and maple woodland free of underbrush except along the creeks, and sufficiently open to allow the growth of grasses and peavine. Each spring cattle were fattened on these pastures before being driven to the coast.

By 1972, when the site was acquired by the NPS, nearly two centuries of farming had produced a mosaic of fields, house sites, orchards, pine plantations, and abandoned scrubland. Only in the woods along the creeks did some of the historic populations remain. The Master Plan called for a restoration and reconstruction of the 1781 landscape.

The vegetation of the battlefield core and its periphery is to return to its appearance on January 17, 1781. The battlefield will appear as pastureland with scattered trees, and this will gradually merge into dense woodland which will simulate the heavy forest typical of Piedmont South Carolina in Colonial times. This forest will eventually return if nature is let alone to accomplish it. There were swamps and canebreaks in 1781, and they should be allowed to revegetate, too. The woodland will double as a screen around the periphery of the battlefield, and at the south end it will be extensive enough to simulate the mile upon mile of heavy forest which dictated the selection of the open Cowpens as a battleground. (Cowpens NB Master Plan p. 12).

It was estimated that it would be at least 40 years before a deciduous



Fig. 9. Aerial photograph of Cowpens in 1970.
In the two centuries since the battle, a woodland pasture has been replaced by a mosaic of fields, house sites, orchards, pine plantations and scrubland.
Photo: USDA Agricultural Stabilization and Conservation Service, 1970.

forest cover could be reestablished across the site, and another 50 years before it begins to resemble that of the 18th century. Natural succession is being allowed to proceed throughout the site, but in the battlefield core a planting program using volunteer labor is attempting to accelerate the establishment of a tree cover.

The composition and form of the woodland may vary significantly from the original because of the history of disturbance. Soil erosion, changes in the water table and air pollution (including pesticides sprayed in adjacent peach orchards) will probably affect the composition. Chestnut blight is preventing the return of one important species. The removal of anachronistic structures has been completed but it will be many years before all traces disappear. Old road beds, scarified and seeded, form open swaths across the site. Soil conservation terraces and drainage ditches are embedded in patches of woodland. But the major problem for management today is the widespread distribution of exotic vegetation. Ornamental trees, shrubs and vines mark old home sites, and some may persist in an open woodland pasture. Kudzu is being controlled by the use of herbicide followed by the fertilization of natives to speed recovery and closure of the canopy. Ways are still being sought to control the rapid spread of Japanese honeysuckle and Asiatic bamboo.

Several questions concerning the reestablishment of the pasture within the woodland remain to be resolved. More information is needed as to the type of cattle and the composition of the pasture on which they fed. Practical problems of managing cattle without fences may be difficult to solve. (In the historic period, the pens were about two miles away.) The impact of grazing on the regeneration of the woodland as well as the risk of conflict between cattle and automobiles may require the introduction of fencing. It may indeed be necessary to settle for a partial restoration. If the cattle

are omitted, the grasses could be maintained by rough mowing.

The regeneration of the historic woodland pasture, therefore, is more than a question of time. But time is perhaps the most intractable problem. An ancient woodland has a complex flora and fauna which research suggests is not regained by a restored woodland.

Conclusion

A careful assessment should be made of the feasibility of a complete or partial restoration meeting the recommended standards of integrity. Where those standards cannot be met, restoration may prove inaccurate and misleading and should not be undertaken.

Section Six References

- Bratton, Susan P. 1983. The Vegetation History of Fort Frederica Saint Simons Island Ga. U.S. Dept. of the Interior NPS Research/Resources Management Report SER-66.
- Bearss, Edwin C. 1974. Historic Grounds and Resource Study Cowpens Battlefield, S.C. U.S. Dept. of the Interior. NPS
- U.S. Dept. of the Interior NPS 1970. Cowpens National Battlefield S.C. Master Plan.
- U.S. Department of the Interior NPS 1974. Draft Environmental Statement Master Plan and Development Concept Plan Cowpens National Battlefield.
- Bratton, Susan P. and Teri Butler. 1982. The Distribution of Exotic Plant Species at Cowpens National Battlefield. Report for the Superintendent U.S. Dept. of the Interior NPS Southeast Regional Office, Atlanta, Ga.

SECTION SEVEN

MAINTENANCE

Preservation and Maintenance

The success of a preservation or restoration project depends on the development of an appropriate maintenance strategy. The process of preservation or restoration cannot be separated from the problems of maintenance.

Historic plant and animal populations will retain their original characteristics only as long as the historic management practices are repeated. But an exact repetition of all the activities relating to regeneration, care, protection, harvest and, if appropriate, use may not be feasible, so it may be necessary to seek alternatives. Those alternatives may involve "improvements" such as the substitution of powered machinery for hand tools, or different systems of management, such as the substitution of mowing or burning for grazing as a method of maintaining grassland.

Maintenance techniques should be evaluated in terms of:

the integrity of the biotic cultural resources,
environmental impacts,
costs and benefits, and
administrative and legal constraints.

Evaluation of Historic Techniques

Integrity

A comprehensive preservation or restoration of a biotic cultural resource requires an exact repetition of the historic management techniques to maintain it. Where some historic populations have been lost, it may be necessary to replace them with modern varieties or breeds, if need be, to maintain the historic characteristics of the remaining parts of a community. For example, the maintenance of the historic character of pastures requires the presence

of the historic herds or their present-day equivalent. Whether it is feasible to repeat the exact historic management techniques depends on a resolution of the following issues.

Environmental Impacts

In many parts of the southeast, historic techniques abused and abandoned the land. Shifting cultivation was widely practiced; when yields decreased, new land was cleared from the forest. The resources of the forest seemed limitless and areas were indiscriminately burned and grazed. These frontier practices could only be countenanced while new lands were available. They are incompatible with the maintenance of a stable settled landscape and in conflict with the mission of the NPS in an era which recognizes resource limits. Some historic practices must therefore be modified or prohibited.

Costs and Benefits

Historic methods of working land were often labor-intensive. On a farm the entire family provided the work force and a revival with paid labor means high costs. Moreover, few people in the late 20th century are prepared to accept the working conditions of an earlier era. It is easier to stage demonstrations or construction projects than to continue the daily routines year after year. Any financial returns from farm products seldom balance these costs, as many of the products cannot compete in today's marketplace.

Administrative and Legal Constraints

Legal obstacles can exacerbate economic problems. Legislation on the control of diseases and noxious weeds, and the production and use of some crops may prevent a revival of historic practices. Moreover, there are ethical problems in a complete return to the past. This is especially true in the care and protection of livestock.

Application

A return to historic management techniques is primarily associated with

"living farm" projects. On these farms the various biotic communities have been preserved, restored or, in some cases, reconstructed. The requirements and problems of such an ambitious undertaking are well illustrated at Hensley Settlement in Cumberland Gap NHP.

Restoration and reconstruction began in 1966 after nearly two decades of abandonment. Part of the settlement site was cleared and houses, barns, henhouses, hogpens and fences, etc. were restored or reconstructed with the advice of former residents.

In 1972, a Farm Management Plan for the Willie Gibbons Farm was prepared specifying the historic management techniques for all the biotic communities on the farm - fields, pastures, orchards and woodlots with their various plant and animal populations.

Although the aim was to repeat exactly the historic farming system, the Plan recognized some of the difficulties and decided a number of "historical inaccuracies" would be unavoidable. Certain destructive practices would have to be prohibited, such as severe overgrazing of the land by livestock and indiscriminate burning and grazing of the forests. Other modifications would have to be made for economic reasons, including a limited use of modern equipment for plowing, seeding, cultivation and harvesting, but some fields would be worked by mule as a demonstration of historic methods. Finally, legal restrictions had to be recognized on activities such as hunting, the sale of farm products which would not meet public health standards and the sale of moonshine.

For a few years in the early 1970s, one of the members of the settlement, Jesse Gibbons, returned to live on the mountain. In addition to acting as a farmer-demonstrator, he kept his own animals and fowl and grew his own vegetables. During this period many of the old farming practices were revived.

After Jesse Gibbons suffered a heart attack and left the mountain, the



Fig. 10. Chester Thomas plowing at Hensley Settlement.
Some of the historic farming practices are continued at the Settlement
by ranger-demonstrators.
Photo: Charles Anibal, 1975, in the collection of Cumberland Gap
NHP.



Fig. II. Stacking Hay at Hensley Settlement.
Hay is raked with a horse drawn hayrake and stacked using wooden pitchforks.
Photo: Gene Cox, 1975, in the collection of Cumberland Gap NHP.

high costs of maintaining the project in such an isolated location led to omissions and variations from the 1972 plan. Only a selection of crops and stock have been farmed in the past ten years.

In 1982, a revised Farm Management Plan recommended changing the historic system to make it more commercially viable. The main proposal was to build up the sheep herd to around 100 animals over two years.

The plan was not approved and the livestock were removed from the Settlement in 1983. Selected crops continue to be grown for demonstration purposes but the pastures are now maintained by mowing. The hustle and bustle of a working farm have gone. Interpretation programs now focus on annual events - a sorghum stir-off, or a demonstration of moonshine making.

Evaluation of Alternative Techniques

Integrity

Any change from the historic management techniques will be reflected in the organization of a biotic community. Some changes in organization may be almost imperceptible, while others may be obvious even to an uninformed observer. Changes due to improvements in equipment are sometimes difficult for the general public to detect, but nevertheless a field mowed by a machine is likely to develop a different species composition from one mown by hand with a scythe. The effects of a change in management system are usually more visible, for example the changes in grassland composition which would result from a substitution of mowing or burning for grazing.

Normally, the alternative technique which involves the least change in a historic community or population is to be preferred, but one must also consider the following issues.

Environmental Impacts

In addition to the effects on historic populations, it is important to evaluate the impacts of alternative management techniques on natural resources including

wildlife. The aim should be to develop a stable system capable of being sustained indefinitely.

The impact of the management practices on any historic structures must be assessed. A risk of damage may require restrictions on the size and type of equipment or prohibit the use of some techniques such as burning.

Costs and Benefits

A need to reduce labor costs is often the major reason for seeking alternatives to historic practices. Costs are related to the numbers and skill level of the labor force and the nature and timing of the tasks. Maintenance is a long-term commitment and should not be dependent on the availability of a volunteer workforce.

The costs of maintenance by alternative techniques may be offset by an economic return.

Legal and Administrative Constraints

Introduction of modern management techniques may allow an area to remain in commercially productive use. Fields, pastures, orchards, etc. may be directly managed by park staff and the products sold by a park, but it is more usual to lease the land to local farmers. When land is leased, a memorandum of agreement should specify any restrictions on use necessary to preserve the historic characteristics of the biotic communities.

Whether land is leased or directly managed by park staff, a system for monitoring the impacts of management on the integrity of cultural resources and on the wider environment should be established.

Application

A number of parks are experimenting with alternative techniques, particularly for the maintenance of areas which were once pastures. The problems of maintaining herds of livestock, especially where in the historic period these

were free ranging, has caused parks to explore alternatives. A good example of a systematic evaluation of these alternatives is provided by the experimental management of two grassy balds in the Great Smoky Mountains NP.

The grassy balds were maintained before the establishment of the park by the summer grazing of large herds of cattle and sheep. This was discontinued and shrub and tree species began to invade the balds from the forest edges. At first the effect was to enhance the floristic diversity of the balds. Azalea and other flowering shrubs invaded the pastures and their late spring display reached a peak in the 1950s. Thereafter tree species began to dominate and the effects of succession became a matter of public concern. The balds had attracted hikers because of the views from the open tops and their flora which included several rare plants. Both attractions were threatened by the advancing forest. Although the balds were in a "Natural Area" of the park, a study was begun in 1975 of the progress of succession on Gregory Bald and Andrews Bald, and of techniques which could be used to arrest or reverse this process.

The experience of the U.S. Forest Service in maintaining several grassy balds by fire, mowing, grazing and hand cutting was studied, and tests of the last two methods were conducted on Gregory Bald. The alternative techniques were analyzed for their historical authenticity, environmental impacts, cost and administrative practicality.

A return to the historic system of grazing cattle and sheep on the balds would reestablish the historic character of these areas but would also cause a number of adverse impacts and be very expensive. The stock could not be allowed to range freely, so the costs would include the construction of fences and other structures. The introduction of some animals, which were not an important part of the historic herds, would have some advantages. Goats browse woody plants and could accelerate a return to the open bald. Donkeys would



Fig. 12. Sheep grazing on Gregory Bald before the establishment of the Great Smoky Mountains NP.

Management experiments have been conducted on this bald to evaluate alternative techniques for the maintenance of its historic character. Photo: Thompson Bros., no date, in the collection of Great Smoky Mountains NP.



Fig. 13. Clearance work on Gregory Bald in 1975.
The disposal of slash in the surrounding forest proved to be one of the most difficult and time-consuming parts of the cutting program.
Photo: Susan Bratton, 1975.

be best able to fight off predators - bears and mountain lions.

The use of fire would alter the historic composition of the balds somewhat and it would not select for botanically desirable species such as azaleas. But burning is a relatively cheap method of controlling succession. Its effectiveness would depend on the frequency and intensity of the burns. The impacts of fire also depend on the timing - for example, a spring burn is more difficult to arrange but the area would recover faster.

In the initial clearance experiments, cutting had to be done with hand tools as the park discouraged the use of power tools in backcountry areas.

It was therefore time-consuming and expensive. The most difficult task was the disposal of the slash in the surrounding forest. Cutting has the advantage of precision, but without the use of herbicides many woody species would resprout. If the cutting program were to be discontinued before a grass sward was completely reestablished, root sprouting could result in an even denser shrub thicket than existed before any action was taken. Mowing would be an effective method of maintaining grass areas once initial clearance has been completed. But the species composition would probably be altered, and maintenance would be expensive as scythes or hand mowers would have to be used.

The study concluded:

Although cutting and grazing would be the most historically correct sequence of grassy balds management and would likely best maintain their character, the most practical techniques would probably be cutting followed by mowing, or cutting followed by burning and mowing (Lindsay, M.C. & Bratton, S.P. 1979, pp. 429).

The 1982 General Management Plan for the park designated Andrews and Gregory Balds as experimental research subzones within a Natural Area. Volunteers began to clear Andrews Bald the next year using hand and power

cutting equipment with a limited application of herbicides to prevent resprouting. The clearance of Gregory Bald began in 1984. The aim of the program is to restore the balds to their 1940s configuration. A return to historic management with cattle and sheep is not considered feasible, but the long-term method of maintenance has yet to be determined.

All the other grassy balds within the Park will continue to be protected as Natural Areas and succession will proceed unchecked. It is estimated that they will become closed forest communities in 30 to 70 years time.

Conclusions

There are intractable environmental, economic and legal obstacles to the maintenance of large areas by a return to historic management systems. The use of historic techniques is only feasible on a limited scale, applied to selected communities or populations, where there are no insoluble environmental or legal problems. Elsewhere, alternative management techniques must be employed, even when it may mean a modification of historic characteristics.

To ensure proper public understanding, a clear distinction should be made in interpretive programs between those communities or populations which are being maintained by historic techniques and which retain all their historic characteristics, and those which have been modified by the use of non-historic techniques.

Section Seven References

U.S. Department of the Interior NPS 1971. Cumberland Gap NHP Ky/Va/Tenn Interpretive Prospectus.

Boyles, Fred. (no date) A Brief History of the Restoration of Hensley Settlement Cumberland Gap NHP.

U.S. Dept. of the Interior NPS 1972. Farm Management Plan Hensley Settlement Cumberland Gap, NHP.

Cox, William E. 1978. Hensley Settlement A Mountain Community Eastern National Park and Monument Association.

U.S. Dept. of the Interior NPS 1983. Hensley Settlement Cumberland Gap NHP Operations Program Environmental Assessment.

Lindsay, Mary. 1977. Management of grassy balds in Great Smoky Mountains National Park. U.S. Dept. of the Interior NPS Southeast Region Uplands Field Research Laboratory Management Report No. 17.

Lindsay, Mary and Susan P. Bratton, 1979. "Grassy Balds of the Great Smoky Mountains: Their History and Flora in Relation to Potential Management." Environmental Management Vol. 3, No. 5, pp. 417-430.

U.S. Dept. of the Interior. NPS 1982. Final Environmental Impact Statement for the General Management Plan Great Smoky Mountains National Park N.C./Tenn., Denver, Co.

SECTION EIGHT

LANDSCAPE MANAGEMENT

Alternatives to Preservation

It is seldom feasible to preserve or restore all the components of a historic scene. Inadequate historical information, or an inability to recover or maintain historic characteristics, makes it necessary to consider alternatives to the preservation and restoration of biotic cultural resources.

There are three principal alternatives:

replacement with equivalent communities,

replacement with grassland communities, and

release to allow the return of native vegetation and wildlife.

Each of these alternatives should be managed to retain some link to the landscape of a historic period.

Replacement with an Equivalent Community

An equivalent biotic community is one in which present day varieties of plants and breeds of animals are substituted for the historic populations and modern management techniques are employed. The historic land use is repeated, but the original community is replaced by an "improved" version. This commonly occurs where land remains in productive agricultural use.

Links to a Historic Period

The main link to the past is in the repetition of land use. The present day community will differ from the historic community in composition and organization, but wherever possible historic boundaries and components of the historic setting should be retained. Economic farming may bring pressures to sever these links - to eliminate field boundaries, to replace historic structures with more efficient ones, or to convert the land to a new use. These pressures must be resisted in historic districts.

Management Issues

A continuation of productive agricultural use has a number of advantages for park management. Land is usually leased to local farmers and remains a productive part of a local economy. The local farmers' land management expertise is tapped and a park may receive an income from the leases. However, park management must strike a balance between the requirements of economic farming and the need to retain links to a historic period. This balance must resolve the following issues.

Some restrictions on the way the land is worked are always necessary to protect the land (for example, soils and streams) from misuse. These conservation measures may operate in favor of or against the preservation of historic land use patterns.

Preservation of historic features may raise a farmer's costs. This may be offset by a reduction in rent, but in marginal areas restrictions may make farming an uneconomic proposition.

The administration of agricultural leases requires the necessary expertise to weigh the historical, environmental and economic implications of any action. Decisions to restrict lessees' operations may be complicated by political pressures.

Application

Replacement of biotic cultural resources with equivalent communities has a wide application in the Southeast Region. The need for a judicious compromise between the various interests involved can be illustrated at Shiloh NMP.

At Shiloh the fields are leased with the exception of those most affected by monuments. The leasing agreements were originally seen as a way to reduce mowing rather than as a method of reintroducing historic land use. The land



Fig. 14. Cotton in Sarah Bell's Field, Shiloh.
Cotton is planted in some section of this field each year to indicate the historic land use. A commercial crop is produced using a modern variety and present day farming techniques.
Photo: George Reaves, 1985.

is now leased under the provisions of the Historic Preservation Act which allows the Park to retain the income. The Act requires a competitive bid procedure which has encouraged the development of detailed specifications in the memorandums of agreement. These are designed to secure a compromise between the cultivation of "historic" crops and good land management practices, while allowing a reasonable economic return to the lessee.

The leasing agreements require the "historic" crops to be grown in the appropriate locations. At Sarah Bell's Field, for example, the farmer must plant cotton in some section of the field each year. However, as a precaution against soil loss, clauses in the agreement specify a crop rotation and measures to maintain soil fertility. The disking of land that will remain fallow in the winter is prohibited, and where necessary, sod waterways and turning strips must be provided.

In some parts of the battlefield the risk of soil erosion prevents the restoration of the fields to their 1862 configuration. For example, Fraley Field - another old cotton field - has not been completely cleared of second growth woodland, because some areas beside streams are subject to gully erosion.

The park has also reintroduced some apple and peach orchards; but these are not economically productive and are not leased. Instead old varieties of fruit trees have been planted and the orchards are maintained by the park as close to their historic appearance as possible.

Replacement with a Grassland Community

In many historic districts, various grassland communities - pastures, hayfields, mown lawns, etc. - have replaced historic vegetation communities. These grasslands maintain "open" spaces, allowing visitors clear views and, where necessary, ready access across these areas. But uniform green spaces

provide no clue to historic land use and interpretive programs have to counteract the misleading impression such spaces give.

Links to a Historic Period

A grassland should not shroud a historic landscape but rather help to delineate its geography. For this to occur, a variety of management techniques must be employed. The use of different mowing regimes, and grazing and burning can produce variations in composition to differentiate significant areas. The geography of a historic period, such as the layout of old fields, the location of roads and tracks, or the position of defensive lines on a battlefield, could be indicated by these variations.

Management Issues

In assigning different management techniques to different areas, a number of issues have to be considered. First, the effect of the various techniques on grassland composition must be studied. Wherever possible, historically appropriate varieties of grasses and cane should be favored by management. The appropriateness of lawns, meadows, old fields, etc. as indicators of historic patterns of land use should be evaluated.

Each management technique has different environmental impacts and these must be considered. For example, burning might involve unacceptable risks on slopes subject to soil erosion.

The costs and benefits of the various techniques will vary from location to location and from year to year. The minimum acreage necessary for economic operation as a pasture or hayfield varies with the type of farming enterprise. The costs of mowing are related to the complexity of the mowing patterns and type of equipment required, as well as to the acreage and schedule.

The administration of a diversified grassland will be more complex than that of a uniform area. But there can be advantages in the administrative



Fig. 15 Barracks Street, Fort Frederica.
The positions of streets and lots in the colonial town plan are indicated by different mowing regimes.
Photo: 1975, in the collection of Fort Frederica NM.

flexibility given by a variety of options. In addition, a pattern of mown and unmown areas can be used to guide public use, discouraging access to areas vulnerable to overuse or misuse, while encouraging access to other areas.

Application

Opportunities to diversify grasslands to assist interpretive programs can be found in many parks in the Southeast. A couple of examples will be given.

At Fort Frederica NM, there are major obstacles to any restoration of the townsite to its colonial appearance. The long history of disturbance has removed most traces of the colonial landscape, historical data on the area within the town is inadequate for any restoration other than the replanting of shade trees, and the majority of the Commons is outside NPS control.

The townsite is currently maintained as a lawn. The unit is already following a policy of marking streets and lots by different mowing regimes. This policy should be extended to demarcate other areas such as the parade ground, encampment and parapets. A general reduction in the number of areas which are frequently mown would allow more of the site to resemble an old field. This would have the advantage of more closely resembling the old Indian field the colonists found when they arrived.

At Cades Cove in Great Smoky Mountains NP, the valley floor has been transformed into an open parklike grassland. The original economy of the valley was based on a triad common to many mountain areas. Bottomland was cultivated, forested slopes were used for hunting and gathering, and mountain tops provided summer pastures. This economy died with the establishment of the park. To keep the bottomland open, it was leased as hayfields and pastures. Plowing virtually ceased and the mosaic of small fields was replaced by large expanses of grass.

Criticism has focused on the impact on natural resources within and beyond



Fig. 16. Cades Cove, Great Smoky Mountains, in 1936.
Corn and other row crops were grown on the valley floor while the mountains provided summer pastures for livestock.
Photo: A. Stupka, 1936, in the collection of Great Smoky Mountains NP.



Fig. 17. Cades Cove, Great Smoky Mountains, today.
The valley floor has been transformed into an open parklike grassland, leased for the production of hay and grazing of cattle. Much of the original field pattern has disappeared.
Photo: no date, in the collection of Great Smoky Mountains NP.

the historic district. Streams were enriched by cattle wastes and field fertilization, and additional silt loading was caused by cattle watering. The deterioration in water quality threatened fishing and other recreational uses of Abrams Creek outside the historic district. A series of studies in the 1970s led to changes in management. The maximum number of cattle was reduced from 1500 to 500, and the cattle were fenced away from the creeks. Water quality was improved and stream bank vegetation has begun to recover. But these restrictions have made it more difficult to lease the land - the distance from farmers' base of operations outside the valley being a continuing problem for economic farming.

The park therefore has been considering management alternatives. The reintroduction of row crops is discounted as uneconomic and likely to cause soil erosion problems - although it may be considered as part of an interpretive program near some of the cabins. A more feasible alternative is to release some of the fields and arrest succession by periodic mowing or burning. This could have a number of advantages. It would present an opportunity to reinstate some of the historic field patterns and recover the lost scale of the historic landscape. A trail system could be expanded into old fields from the congested loop road without fear of conflicts with lessees. In addition, the botanical and possibly wildlife interest of the area would increase. The park would have to pay for the periodic maintenance of the old fields, but the costs and problems of administering the farming leases would be reduced.

Release

Release from management usually means a return of native vegetation and wildlife. These reclaim abandoned areas, replacing the managed plant and animal populations of a historic period. The land is allowed to heal itself and the costs of managing a stable climax community, once one is reestablished, are minimal.

Links to a Historic Period

The return of native vegetation and wildlife can be seen as a return to presettlement conditions. But some legacies from a historic period are likely to persist and should be protected.

Some biota introduced in the historic period may be able to effectively compete with native species and find a niche within the returning forest. Normally these should be allowed to remain in historic districts, but the escape of exotic species from these districts into natural areas is a widespread problem and one that is difficult and costly to control. Consequently, invasive species should be controlled within historic districts.

Historic structures, buildings, earthworks, etc. should be protected from advancing vegetation. The returning forest may accelerate the disintegration of any remaining structures and pose a significant fire hazard. A cleared area has to be maintained around these structures. The clearings should be designed not only to protect structures, but to keep open significant paths and views to enable visitors to understand the geographic relationships of the historic period.

Management Issues

Clearings should follow as far as possible historic land use patterns. Open spaces around buildings should conform to the shape of historic enclosures, paths should follow historic alignments, and vistas should link historically significant landmarks. But a number of other factors must be considered in determining the location, size and shape of these areas.

Clearings may cause a variety of environmental impacts. The process of clearance may damage areas susceptible to soil erosion, but once cleared these areas can be stabilized effectively by a permanent cover of grass. Some

wildlife populations may benefit from the maintenance of open areas. On the other hand, edges of cleared areas may provide corridors for the spread of invasive plants such as kudzu.

The costs of clearance and maintenance depend on the methods used. Most clearings are managed as grasslands; and where large areas are to be maintained, a variety of techniques should be considered as discussed in previous paragraphs.

In reestablishing historic paths, the circulation patterns of visitors, vehicular access, and maintenance requirements have to be considered.

Application

The majority of historic districts in the region have areas which have been released from management and are returning to forest. In some cases historic practices had damaged the land; in others, the costs of maintenance as open areas was considered excessive. In some of these districts selective clearance policies are being developed.

At Vicksburg NMP the valleys between the Union and Confederate lines have been allowed to return to forest over the past fifty years. Before the Civil War, this area had been open farmland with some woods and canebrakes. The timber was cut by the two armies to construct fortifications, then during the siege, the ground was denuded of most vegetation and pounded into mud. In subsequent years, the area reverted to open fields and pastures, until the Civilian Conservation Corps began an afforestation program in the 1930s. The loess soils of the slopes are highly erodible - a condition aggravated by overgrazing. The return of the forest was intended to protect the historic land form. Only the high ground, alongside the tour roads following the siege lines, was maintained in grass.

The growth of trees, however, has screened the Union and Confederate positions from each other and cannons which once enjoyed a clear view of enemy lines now point aimlessly into the forest. Consequently, the park has



Fig. 18. The valley of Mint Springs, Vicksburg, c. 1900.
The afforestation of this valley in the past 50 years has obscured
this view across the valley between the Confederate and Union positions.
Photo: no date, c. 1900, in the collection of Vicksburg NMP.



Fig. 19. Thayer's Approach, Vicksburg.
This is one of a number of vistas cleared between strategic points on the Union and Confederate lines.
Photo: B. Pickett, 1982, in the collection of Vicksburg NMP.

undertaken a program of vista clearance between strategic points on the two lines. In places these vistas are followed by foot trails to allow visitors to understand more clearly the conduct of the battle. Cleared areas are maintained as grassland, but they need not be mown with the same frequency as areas alongside the tour roads and gun emplacements. In the past the park has permitted grazing and burning as maintenance techniques, and it is currently reevaluating its mowing program. There would be advantages in diversifying the grasslands. In some areas where native cane was present at the time of the battle, the cane has begun to reestablish itself and these canebrakes should be allowed to spread.

Portsmouth Village on Cape Lookout NS has become overgrown with a dense shrub thicket since grazing ended about 40 years ago. Portsmouth Island had been grazed by cattle, sheep, horses, etc. for two centuries. The animals grazed freely across the island and early photographs show the area as nearly treeless. Today, an impenetrable, vine-tangled thicket dominated by eastern red cedar, wax myrtle and marsh elder hides much of the village. This change from the historic scene makes it difficult for visitors to orient themselves and presents a fire hazard to the buildings in the village.

The park has begun a brushing out program around the historic buildings. However, research is needed to determine an appropriate size and shape for the clearings. Historical research is in progress to identify the pattern of land use around each structure. Some buildings had fenced yards which could be reestablished. The clearings around the structures are linked along the historic paths, but some views need to be opened to the inlets and marshes. An experiment has been conducted to test the effectiveness of goats in maintaining small enclosures. The experiment might be extended to include other types of grazing animals and other maintenance techniques. A mix of different



Fig. 20. Portsmouth Village, Cape Lookout, c. 1920.
This view from the Lifesaving Station past the horse barns to the village, shows the area to be virtually treeless.
Photo: c. 1920, in the collection of Cape Lookout NS.



Fig. 2l. Portsmouth Village in 1979.

A dense shrub thicket has developed since grazing was ended. The cleared area beside the Lifesaving Station in the foreground is maintained as an aircraft landing strip.

Photo: Bruce Weber, 1979, in the collection of Cape Lookout NS.

techniques will probably be necessary to maintain a variety of wet and dry, and fenced and unfenced areas.

Conclusion

A combination of alternative strategies should be adopted for the management of landscapes in historic districts. The preferred strategies are:

preservation - of significant biotic cultural resources, where sufficient historic characteristics remain to convey the historical associations of the place;

or restoration - where essential for public understanding and appreciation of those historical associations.

When preservation and restoration are not feasible because of a lack of historical data, or an inability to recover the historic characteristics or to maintain those characteristics, then:

replacement - with an equivalent biotic community would maintain a continuity in land use.

Where this is not feasible because of environmental, economic or administrative constraints then:

replacement - with grassland would maintain open areas, or

release - would return the area to presettlement conditions.

The resulting landscapes will be rather complex, and various areas will have different links to the past. This will present a challenge to interpretive programs.

Interpretation should be based on a clear identification of the differences between the present landscape and the historic scene. Where parts of a biotic community have been preserved, interpretation programs should identify missing elements and changes in community organization. Where restoration has been undertaken, programs should explain the process of recovery and its limitations.

Where an equivalent community has replaced an original, the differences in composition and management should be emphasized, not hidden, by interpretive programs. Where grasslands are introduced, interpretation should relate the configuration of the present grass areas to their geography in a historic period, and where forests are allowed to return programs should emphasize the cyclical character of these landscapes. Interpretation should encourage an appreciation of the dynamic nature of landscapes.

The enjoyment of a historic landscape requires time. It is not a scene to be fixed and framed; to be briefly surveyed and instantly comprehended. Like a natural area, a historic district should invite longer stays for exploration and discovery - to appreciate a place in time.

Section Eight References

- U.S. Dept. of the Interior NPS 1983. Request for Quotations and Memorandum of Agreement for Management of Historic Fields at Shiloh National Military Park Shiloh, Tenn.
- U.S. Dept. of the Interior NPS 1979. Fort Frederica NM Interpretive Prospectus.
- Bratton, Susan P. 1983. The Interpretation and Management of the Vegetation of Fort Frederica NM St. Simons Island, Ga. NPS CPSU Technical Report 5, Institute of Ecology, University of Georgia.
- U.S. Dept. of the Interior NPS 1982. Final Environmental Impact Statement for the General Management Plan Great Smoky Mountains National Park NC/Tenn. Denver, Co.
- Trout, Edward L. 1976. Cades Cove Management Memorandum from Park Historian July 16, 1976 files of Great Smoky Mountains National Park.
- Bratton, Susan P., R.C. Mathews and P.S. White. 1980. "Agricultural Area Impacts within a Natural Area: Cades Cove, a Case History". Environmental Management. Vol. 4, no. 5, pp. 433-448.

- U.S. Dept. of the Interior NPS 1969. Natural Resources Management Plan
Vicksburg NMP and NC.
- U.S. Dept. of the Interior NPS 1974. Vicksburg NMP and NC Miss. Interpretive
Prospectus.
- U.S. Dept. of the Interior NPS 1979. Vicksburg NMP and NC Miss.
Environmental Assessment General Management Plan. Denver. Co.
- U.S. Dept. of the Interior NPS 1980. Vicksburg NMP and NC Miss. Final
General Management Plan.
- Olson, Sarah. 1982. Historic Resource Study Portsmouth Village, Cape Lookout
NS N.C. Denver, Co.
- U.S. Dept. of the Interior NPS 1980. Interpretive Prospectus Cape Lookout
NS. Harpers Ferry.

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